

DANIELS SURVEY, P.C.

Debra Daniels Mithoefer, P.L.S.

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**TOWN OF DORSET, VERMONT
&
TOWN OF MANCHESTER, VERMONT
Town Line Boundary Survey**

PROJECT OUTLINE PREPARED ON September 19, 2019

BY DANIELS SURVEY, P.C. AT THE REQUEST OF THE TOWN OF DORSET & THE TOWN OF MANCHESTER

PROJECT UNDERSTANDING: Neither the Town of Dorset nor the Town of Manchester have direct knowledge of the location and status of their mutual town line boundary. Boundary surveys by others have depicted the approximate town line boundary location in different locations based on best available information at the time of their surveys. Tax map compilers have also indicated approximate town line boundary locations based on information provided to them by local authorities. Other authorities have added their two cents as well. These approximations of the town line boundary have been sufficient for past purposes. There now exists a need to be able to say with certainty just where the town line boundary exists on the ground and there is a need to appropriately perpetuate the town line boundary. The mutual town line boundary runs east to west and is approximately 6 miles in length.

PROJECT GOAL: The desired result of this project is to form a professional opinion about the location and status of the Dorset/Manchester town line boundary. Secondary to this goal will be the act of perpetuating said line on the ground and in the land records.

PROJECT DESCRIPTION: Preliminary search for and review of documents and physical evidence relevant to the present day location and status of the Dorset/Manchester town line. Thereafter, conduct additional research, search for and inspect physical evidence, gather evidence (field survey), compile information, reconcile written and physical evidence about the location and status of "the town line boundary", monument and map the town line as appropriate, prepare surveyors report detailing the project and assist as needed in providing survey support for any needed legal matters. Title 24: Municipal and County Government Chapter 47: Municipal Line (24 V.S.A. Section 1461), Title 26: Professions and Occupations Chapter 45 and the Administrative Rules of the Board of Land Surveyors, Part 5 and US Forest Service Land Line survey guidelines will serve as guiding documents.

OF NOTE: I have had recent discussions relative to the concept of a town line boundary survey with several surveyors and the Vermont Secretary of State Office. I have reviewed some case law relative to town lines. My initial approach to this project was to treat it like any other boundary survey I undertake. That approach is reflected in my proposal to all of you. There was nothing in my conversations with others that suggested I should take a different path. The consensus was as long as there is no dispute between the towns as to status and location of the town line boundary, then there is no reason to do anything but partner up and conduct a thorough and enduring job.

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MANCHESTER CENTER, VERMONT 05255**

This project should be performed in a manner that will enable both towns the ability to identify the location of the town line boundary on the ground and on a map with certainty for many generations to come. It is my belief that there is simple confusion as to location and status of this town line. From my position, that is very different from not being able to agree to the location. We just have to rediscover the historical evidence of the town line boundary and follow where it leads us. I have been quite amazed over the years at how much written and physical evidence our predecessors have left behind for us to rediscover so we can follow their footsteps!

PHASE 1: PROJECT PLANNING
Preliminary Information Gathering and Define Project Scope
Cost Estimate: \$2500

- Initial meeting with representatives of each town to discuss their views relative to the need and scope of a town line survey. Said meeting will also serve as an opportunity for Daniels Survey, P.C. to explain the various approaches to such a survey. This meeting may be a joint meeting if desired by both towns.
- Review relevant documents as they pertain to this project. Daniels Survey, P.C. respectfully requests each town provide Debra Daniels Mithoefer, PLS with copies of documents they believe to be pertinent to establishing the present day status and location of their mutual town line boundary.
- Serve notice of the survey to adjoining in both towns via letter. Ask for permission to access their land, invite input and explain the process.
- Preliminary search for written and physical evidence supporting the status and location of the town line. This will include preliminary work in local land records, state records and a preliminary search for physical evidence.
- Review of, analysis and compilation of the information gathered during the Phase 1.
- Formulate a preliminary professional opinion about the location and status of the town line.
- Prepare an action plan detailing a summary of additional research needed to support the field survey and written surveyors report.
- Prepare an action plan detailing the field survey.
- Prepare an action plan detailing the process of finalizing the project and providing the deliverables listed below.
- Review of the action plans with the Town of Dorset and the Town of Manchester.
 - Seek mutual agreement from all parties to implement PHASE 2: Research and Field Survey action plan.

PHASE 2: RESEARCH & FIELD SURVEY
Cost Estimate: \$15,000

- Continue records research as needed to establish a complete history of town line boundary status and location
- Continue search for physical evidence of the town line boundary location. This will include the search for original boundary markers as well as evidence along said boundary line that has served as witness to the town line. Attention will be given to areas of interest as identified by either Town.

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- Establish ground control as needed to facilitate location of physical evidence. This ground control shall reference Vermont State Plane Coordinate System.
- Field survey of physical evidence recovered on the ground.
- Review the work product with the Town of Dorset and the Town of Manchester.

FINALIZE PROJECT
Cost Estimate: \$5,000 - \$7000

- Compile and map field survey.
- Reconcile written and physical evidence.
- Finalize professional opinion and prepare surveyor's report.
- Prepare final survey plat
- Review the work product with the Town of Dorset and the Town of Manchester.
- **Submit the final survey plat to each town to allow for compliance with 24 VSA sec1461.**
 Upon ratification of the town line boundary by both municipalities, the town line boundary shall be monumented and witnessed according to the action plan agreed to in Phase1.

PERPETUATE PROJECT
Cost Estimate: \$5,000 plus costs

I recommend the line is witnessed on the ground as follows:

At the end points of the town line and every one mile segment, set very durable monument (see included example of marker). Each of these monuments should be referenced to nearby accessory corner monuments set such that they can be used to reestablish the location of the corner in the event the corner monument is lost or disturbed. Each of these monuments should be witnessed with an orange witness posts (see example).

At all road crossings a durable monument should be set along the town line on the east or west highway line. These monuments should also be witnessed with orange witness posts.

Along the town line, where practical, trees should be blazed and painted red with a good forestry paint according to the USFS standards. Additional witness posts should be set out intervisible or along the line at an agreed upon interval.

Recommended Deliverables

To each town for perpetuation purposes - electronic (.pdf) and hard copy of written documents to include research notes, field journals and survey field book, survey computations, meeting minutes, survey plat (.pdf) and surveyor's report.

At the completion of this project, I recommend the towns agree to a town line maintenance

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program. The details of such a program should be commensurate with local resources and field conditions.

This outline is a guideline and shall be revised as the project unfolds.

Actual costs shall be billed on an hourly rate according to the include rate sheet.

This cost estimate excludes costs associated with the purchase of durable boundary monuments, witness posts, marking paint, etc.

Daniels Survey, P.C. takes pride in working closely with clients to deliver an on time and on budget project.

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DANIELS SURVEY, P.C.

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RATE SCHEDULE JANUARY 2019 – DECEMBER 2019

PROFESSIONAL LAND SURVEYOR \$105.00/HOUR

SURVEY TECH \$60.00/HOUR

CAD TECH \$75.00/HOUR

2 PERSON SURVEY PARTY \$130.00/HOUR

3 PERSON SURVEY PARTY \$160.00/HOUR

GPS STATIC SURVEY: SURVEY PARTY HOURLY RATE PLUS \$350.00 PER CONTROL POINT ESTABLISHED

DIRECT EXPENSES AT COST PLUS 5%

INVOICES ARE DUE ON RECEIPT

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TOWNS OF DORSET & MANCHESTER, VERMONT

Town Line Survey Assistance Agreement

Submitted to the Town of Dorset

&

The Town of Manchester

September 19, 2019

This agreement is made between Daniels Survey, P.C. and the Towns of Dorset & Manchester, VT

By signing below, Debra D. Mithoefer, P.L.S., acting for Daniels Survey, P.C. and the Towns of Dorset and Manchester, agree to work together to resolve discrepancies concerning the location of the town line dividing lands situated in the Town of Dorset land from lands situated in the Town of Manchester. The extent of work to be performed under this agreement shall be limited to what is described as Phase 1 in the Town Line Project Scope Proposal dated September 19, 2019. Said proposal is attached hereto and is part of this agreement.

The fixed fee cost for Phase 1 is reasonably determined and shall be billed bi-monthly in two invoices. One invoice for ½ the amount shall be delivered to the Town of Dorset and one invoice for ½ the amount shall be delivered to the Town of Manchester. Each invoice is payable in full upon receipt. We will strive to complete your project as efficiently and economically as is practically and prudently possible. Should unforeseen circumstances cause a change to this agreement, Daniels Survey, P.C. shall contact both towns to review the situation prior to proceeding with additional work which may not be included within the scope of this agreement.

Please contact me with any questions you might have. If you accept this proposal, please sign a copy of this proposal, keep a copy for yourself and return a copy to me.

Thank you for the opportunity to work with you on this project.

Sincerely,

Debra Daniels Mithoefer P.L.S.

Signed:

Debra Daniels Mithoefer _____

Date: _____

Town of Dorset _____

Date: _____

Town of Manchester _____

Date: _____

DANIELS SURVEY, P.C., 227 SUGAR HOUSE LANE
MANCHESTER CENTER, VERMONT 05255

Resume

Debra Daniels Mithoefer. L.L.S.
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Manchester Center, Vermont 05255
(802) 362-5032 danielssurvey@usa.net

Education:	Middlebury College Middlebury, Vermont B.A., 1978, Environmental Studies and Geography
Experience:	President, Daniels Survey, P.C. (1989 to present) Associate, William F. Kent, Land Surveyor (1986 to 1989) Chief of Surveys, Town of Waterford, Ct. (1983 to 1986) Surveyor in Training, Town of Waterford, Ct. (1979 to 1983)
Professional Licenses	Vermont #615 (1989) New Hampshire #811 (1991) Massachusetts #36121 (1991)
Associations	Vermont Society of Land Surveyors (1989 to present) National Ski Patrol (1979 to present)
Related Professional Activities	Vermont Law School, Guest Lecturer, Land Surveying Town of Ludlow Planning Commission Member - Past Town of Ludlow Ancient Roads Committee Member - Past Vermont Board of Land Surveyors Member - Past

Debra Daniels Mithoefer is the principal of Daniels Survey, P.C., a past VTRANS WBE certified small business. After graduating from Middlebury College in 1978 with a B.A. in Environmental Studies and Geography, she began her career as a surveyor in 1979, establishing Daniels Survey in 1989. Ms. Mithoefer brings nearly 30 years of expertise as a professional land surveyor dealing with land boundary projects for individuals and several Vermont municipalities as well as serving as an expert witness for several land boundary disputes and ancient road cases. She also has many years of experience as a professional survey services sub-consultant teaming with many prime consulting firms. Ms. Mithoefer has been responsible for providing the survey services for several federal, state, municipal and privately funded boundary survey, civil, recreation, transportation and facilities projects. Deb has coordinated and provided survey services for prime consultants on projects to include a state highway corridor improvement project, a municipal visitors' center and recreation trail project, municipal multi use recreation paths, bridge reconstruction projects, waterfront revitalization projects, USDA NRCS property acquisition projects, a downtown redevelopment project and more recently several cemetery expansion projects.

Debra Daniels Mithoefer, Land Surveyor Biography

Debra Daniels Mithoefer, Land Surveyor. Debra Daniels Mithoefer is the principal of Daniels Survey, P.C. After graduating from Middlebury College in 1978 with a degree in Environmental Studies and Geography, she began her career as a surveyor in 1979 and established Daniels Survey in 1989. Ms. Mithoefer brings many years of experience as a professional survey services sub-consultant teaming with several prime consulting firms. Ms. Mithoefer has been responsible for providing the survey services for several state, municipal and privately funded land boundary, civil, recreational, transportation and facilities projects. Recently, she has coordinated and provided survey services for prime consultants on projects to include a state highway corridor improvement project, a municipal visitors' center project, municipal multi use recreation paths, bridge reconstruction projects, a waterfront revitalization project and several cemetery projects. She also brings nearly 30 years of expertise as a professional land surveyor dealing with land boundary and ancient road issues. She holds professional land surveyor licenses in Vermont, New Hampshire and Massachusetts.

When Deb is not busy serving her survey clients, she can be found at Bromley Mountain during the winter months skiing and acting as a weekend ski patrol supervisor. If she is not skiing for Bromley, Deb can be found traveling around the East teaching ski and toboggan clinics for the Eastern Division and the Certified Patroller programs.

Throughout the year, if Deb is not surveying or skiing, you will find her home on her farm that she shares with her husband, dogs, horses, sheep and most recently goats!! The farm is enrolled in the current use program and is actively managed for agriculture as well as forest products.

In order to keep up with all these activities, Deb continues to fit an exercise program into her daily routine. Trail running and road biking are the backbone of her exercise program. Having been a competitive athlete in high school and college, Deb finds the routine of regular exercise fun and rewarding.

Title 24 : Municipal And County Government

Chapter 047 : Municipal Lines

(Cite as: 24 V.S.A. § 1461)

• § 1461. Location or alteration of municipal lines; monuments

(a) When the legislative bodies of adjoining municipalities are able to agree as to the location of a municipal line, each legislative body shall vote in meetings duly warned for the purpose to adopt the location. Prior to the vote, each legislative body shall hold at least one public hearing duly warned for the purpose of informing the public of, and allowing public comment on, the location of the line. Following the meetings, the legislative bodies shall conduct a, or ratify an existing, survey of the municipal line and file certified copies of the minutes of the meetings, and the survey, and a list of property owners, the legal location of whose property is changed by the agreement, with the Secretary of State, the clerk of each of the municipalities, and the Vermont Enhanced 911 Board.

(b) When the legislative bodies of adjoining municipalities are unable to agree as to the location of a municipal line, or in the absence of a clearly definable charter line, the legislative bodies shall sign a written agreement to submit to arbitration pursuant to 12 V.S.A. chapter 192.

(1) If an award of arbitration does not alter a municipal line, the award shall be filed with the Secretary of State and the clerk of each of the municipalities.

(2) If an award of arbitration would result in an alteration of a municipal line, the award shall require that a survey be conducted of the municipal line and apportion the cost of the survey between or among the respective municipalities as deemed appropriate. Following the survey, one or more of the legislative bodies shall petition the General Assembly to adopt the alteration of the municipal line pursuant to the survey. Following enactment of legislation which alters a municipal line, the legislative bodies shall file the survey and a list of property owners, the legal location of whose property is changed by the award, with the Secretary of State, the clerk of each of the municipalities, and the Vermont Enhanced 911 Board. Each legislative body of the adjoining municipalities shall post a notice of the petition to the General Assembly that specifies the nature and extent of the proposed legislation in at least two public places and in the town clerk's office at least three weeks prior to filing the petition.

(c) When the legislative bodies of adjoining municipalities are able to agree as to the location of a municipal line and one or more of the legislative bodies believes that alteration of the existing line or the establishment of a new line is necessary, the

legislative bodies shall conduct a survey of the new municipal line. Following the completion of the survey, one or more of these legislative bodies shall petition the General Assembly to establish the location of the municipal line. Following the enactment of legislation which ratifies the alteration of the municipal line, the legislative bodies shall file the survey and a list of property owners, the legal location of whose property is changed by the legislation, with the Secretary of State, the clerk of each of the municipalities, and the Vermont Enhanced 911 Board. Each legislative body of the adjoining municipalities shall post a notice of the petition to the General Assembly that specifies the nature and extent of the proposed legislation in at least two public places and in the town clerk's office at least three weeks prior to filing the petition.

(d) When the General Assembly enacts legislation which ratifies a survey of a municipal line, it may appropriate funds sufficient to monument those municipal lines at the points on the municipal lines where the lines change direction. If the legislative body of a municipality desires additional monuments, it shall provide funds for those monuments at the expense of the municipality.

(e) A survey required by this section shall be conducted by a land surveyor licensed in this State.

→ (f) The Secretary of State, in consultation with the Agency of Transportation, shall develop a process for requesting proposals for surveying for use by municipalities.

(g) Upon receipt of a list of property owners filed pursuant to subsection (a), (b), or (c) of this section, a municipal clerk shall file the list in the land records of the municipality and shall place in the grantee index of those records the names of property owners whose land or portion thereof has been added to the municipality and in the grantor index of those records the names of property owners whose land or portion thereof has been subtracted from the municipality. (Amended 1967, No. 241 (Adj. Sess.), § 2, eff. Feb. 13, 1968; 1973, No. 193 (Adj. Sess.), § 3, eff. April 9, 1974; 2005, No. 102 (Adj. Sess.), § 1.)

The Vermont Statutes Online

Title 12: Court Procedure

Chapter 192: Arbitration Act

- *Subchapter 1: General Provisions*
- § 5651. Short title

Part 5. Standards for the Practice of Land Surveying

5.1 Authority The Vermont Board of Land Surveyors is authorized by the legislature to adopt rules establishing minimum standards of practice. 26 VSA § 2544(9).

5.2 Purpose and Intent

(a) The purpose of these standards is to establish minimum procedural and technical criteria to govern the performance of land surveyors when more stringent standards are not required. Further, the purpose is to protect the inhabitants and property owners in this state from substandard or incompetent surveying, and generally to safeguard property and the public welfare.

(b) These standards are also a guide for land surveyors in their daily practice and for intern surveyors working to enter the profession.

(c) These standards are intended to allow land surveyors flexibility in their surveying methods and the collection and interpretation of evidence necessary for boundary determination.

(d) If possible, the land surveyor shall locate the corners and boundaries of the property under survey. These standards are developed to satisfy that minimum result.

5.3 Definitions For the purpose of this part:

(a) “Boundary” means: A line of demarcation between adjoining properties and indicating the furthest extent of property.

(b) “Corner” means: A point on a boundary, at which two or more boundaries intersect.

(c) “Document” means: Any instrument which may be used as evidence. A document makes record of letters, figures, marks, or any combination thereof. The term “document” shall be applied broadly to include writings and printed works, maps and plans, photographs and pictures, seals and plates. Documents include record evidence and may be found in a number of locations in addition to the municipal clerks’ offices.

(d) “Evidence” means: Information, observations, or objects that may aid the surveyor in locating the position of a boundary.

(e) “Inconsistency” means: An uncertainty; doubtfulness or a want of clearness and definiteness. Inconsistency means also an ambiguity or that which is difficult to comprehend or distinguish. An inconsistency occurs when title to the same property is expressly conveyed to different parties, where a gap exists between descriptions, or when one party has title and another party has possession, or the documents and record evidence contain ambiguities or conflicting terms.

(f) “Key deed” means the deed which originally created the boundary.

(g) “Land Surveying” means: The definition provided by 26 V.S.A. § 2502.

(h) "Land Surveyor" means a person with a legal right to be in responsible charge of a property survey in this State.

(i) "Monument" means: A physical structure, mark or object that serves to perpetuate the location a corner or point on a boundary. Permanence, durability and stability are implied.

(j) "Positional Tolerance" means: The maximum theoretical uncertainty (at the 95% confidence level) of a measurement between any two corners under survey. The positional tolerance allowed is expressed as a constant (base error) plus the indicated ratio (dependent error) applied to said corners.

(k) "Property:" Property includes land, water, land under water, space, improvements and rights, and easements and servitudes attached thereto.

(l) "Survey Abstract" means: A chronological, condensed history of the record documents pertaining to property boundaries including, but not limited to, conveyances and deeds which may control the location of corners and boundaries of the land under survey.

(1) A survey abstract includes legal descriptions that originally created the subject and abutting parcel(s) which control the location of the corners and boundaries of the property under survey and the abutting properties.

(2) A survey abstract includes pertinent documents related to easements or servitudes that may encumber or benefit the property under survey.

(3) A survey abstract shall be sufficient, if possible, to enable the land surveyor to locate the corners and boundaries of the property under survey and to meet the requirements of these standards.

5.4 Procedural Standards Whenever a land surveyor conducts a survey of property, the surveyor shall, at a minimum, perform the following:

(a) Research and Field Investigation:

(1) Prepare a survey abstract.

(2) Examine, analyze and test consistency of the record evidence. Investigate and document inconsistencies and form preliminary conclusions as to the completeness of the record evidence.

(3) If necessary, obtain and document from knowledgeable and credible persons parol evidence which may control the location of the corners and the boundaries of the property under survey.

(4) Search for physical evidence which may control the location of the corners and the boundaries of the property under survey. Existing monumentation and physical evidence should not be removed or disturbed.

(5) Record and document in detail all physical evidence found or physical evidence of record not found. Descriptions shall include materials, size and shape, identifying marks or numbers, position and stability; cylindrical sizes shall be reported as inside or outside diameter. Position reported shall include the distance above or below ground.

(6) Make, record, and document measurements to ensure the location and perpetuation of pertinent physical evidence.

(b) Computations, Conclusions, and Perpetuation:

- (1) Compute, check, and compare field measurements and pertinent information with record evidence.
- (2) Investigate, document and, if possible, reconcile inconsistencies.
- (3) When necessary, make additional computations and analyses to develop and formalize opinions on the location of the corners and boundaries of the property under survey. Professional opinions shall be based on the best available evidence and in accordance with applicable Vermont boundary law and the established hierarchy of evidence.
- (4) A land surveyor who conducts a survey of property shall set monuments and marks to adequately perpetuate the location of unmarked corners and boundaries of the property under survey.

(c) Results: When the land surveyor cannot prepare a professional opinion on the location of a corner or boundary, the surveyor shall:

- (1) Search for and recover additional or missing evidence that will enable the surveyor to form a professional opinion on the boundaries; or
- (2) Issue a report describing, at a minimum, controlling evidence and conclusions and any inconsistencies, conflicts, or unusual circumstances.

5.5 Technical Standards Only two measurement standards are acceptable. Either the accuracy standard or precision standard may be used. The surveyor shall determine which standard should be used based on the current and future needs of the project. The surveyor shall select and employ proper field procedures, instrumentation, and personnel to achieve the applicable measurement standard.

(a) Survey Classes Guidelines for selection of survey classes by land use.

- (1) Urban - Surveys of more densely settled or developed land lying within or adjoining a city, village or town center. This includes the surveys of commercial and industrial properties, condominiums, town houses, apartments, and other multi-unit developments, regardless of geographic location.
- (2) Suburban - Surveys of land lying outside urban areas and used almost exclusively for single family residences or residential subdivisions.
- (3) Rural - Surveys of lands such as farms and other undeveloped land outside of suburban areas.

(b) Measurement Standards

(1) Accuracy Standard: The maximum positional tolerance of any point on the subject boundary is;

- (A) Urban 0.05 feet plus 1:10,000
- (B) Suburban 0.10 feet plus 1:5,000
- (C) Rural 0.25 feet plus 1:5,000

(2) Precision Standards: Minimum traverse precision ratio after angles are balanced and closure is calculated;

- (A) Urban 1:10,000
- (B) Suburban 1:10,000

(c) Survey Plats A land surveyor who conducts a survey shall, when contracted for by the client, prepare a plat showing the results of the survey and shall furnish a copy to the client. The plat shall be prepared in accordance with the latest adopted version of 27 V.S.A. §1403, Filing of Survey Plats, and 26 V.S.A. § 2596(a), Use of Seal, Certification, and shall also include the following information:

- (1) A detailed description of natural and artificial monuments, noted as found or set. Descriptions shall include materials, size and shape, identifying marks or numbers, position and stability. Cylindrical sizes shall be reported as inside or outside diameter. Position reported shall include the distance above or below ground.
- (2) A delineation of inconsistencies between the survey and the record description and the source of information used as the basis of the survey.
- (3) The name and deed references of the title holder and the adjoiners at the time of survey.
- (4) Visible encroachments onto or from adjoining property or streets and the extent of such encroachments.
- (5) Public and private rights-of-way, easements and rights which are reasonably known or observed that encumber or benefit the land surveyed.
- (6) Sufficient boundary survey data to provide a closed geometric figure of a perimeter survey. A survey of a boundary line adjustment shall have sufficient information to tie into the client's adjoining boundary lines.
- (7) Inscriptions noting the specific evidence used to locate the corners and land boundaries. List sources of information used as the basis for boundary location. Include key deed references.
- (8) The certification statement shall clearly set forth what information was used as the basis of the survey and shall specifically indicate that the survey work identified thereon is consistent with this information. 26 V.S.A. § 2596.
- (9) All lettering and data must be clearly legible.

(d) Monuments

- (1) Monuments shall be durable and stable.
- (2) Monumentation set shall be identified with the license number of the surveyor in responsible charge.
- (3) Monuments set replacing inadequate monuments or missing monuments shall conform to this standard, be documented, and the document be recorded in the public land records.

**FSM 7100 - ENGINEERING MANAGEMENT
CHAPTER 7150 - SURVEYING**

Land surveying activities require access and entry on private land. Most State laws provide the surveyor access to land monuments for the purposes of survey. Line clearing and other surveying activities on private land shall be minimal to prevent adverse relations with the landowner and the potential for a damage or liability claim against the surveyor.

State laws dictate survey standards and document recordation format and procedures. Forest Service surveys shall comply with State survey standards unless our minimum standards are greater than required by the State (FSM 7152.6). The Forest Service shall comply with the State procedures and format for recording documents in the public record.

3. Local Laws and Customs. Line and Staff Officers shall be knowledgeable of local laws and customs affecting land surveys. Any conflicts between Federal, State, and local laws shall be resolved in consultation with the Office of the General Counsel.

7152.5 - Interagency Cooperation

The BLM and Forest Service cooperative survey program includes the following (FSM 1531.1):

1. The Interagency Memorandum of Agreement dated March 19, 1980, provides for Federal survey authority for selected Forest Service employees to accomplish specific land surveying projects under special instructions issued by the BLM.

2. A reimbursable survey or fund transfer program for long-term, project type work that will be financed by the Forest Service and surveyed or accomplished by the BLM. The work may be done entirely by the BLM, or a BLM supervisory surveyor may be assigned to a Forest Service unit to accomplish land surveys using Forest Service field crews and/or contracting procedures.

3. A cooperative training program to develop and accomplish interagency training courses, slide/tape training courses, and some college level training courses in selected surveying subjects.

4. Unusual surveying equipment is available for Forest Service use from the BLM equipment cache.

7152.6 - Standards

1. Survey standards for the establishment of property corners and/or reestablishment of lost corner positions are usually specified by either Federal regulations or State statutes. Minimum Forest Service survey accuracy standards are:

- a. Survey techniques shall ensure a survey error of closure of not less than 1/5000 (1 unit of error in 5000 units).

**FSM 7100 - ENGINEERING MANAGEMENT
CHAPTER 7150 - SURVEYING**

- b. Corner positional accuracy standards are specified in EM 7150-3, Land Surveying Guide.
- c. State and Federal statutory standards, which are more rigid, shall be used as appropriate.

2. Monumentation Standards. Monumentation of property and property controlling corners is a function reserved by Federal and State law to properly authorized surveyors.

a. Corner monuments:

- (1) Surveys performed under Federal survey authority must use monuments and procedures as specified by the BLM.
- (2) Minimum Forest Service standards for monuments set under State survey authority shall be 2-1/2 inches outside diameter pipe, made of iron, aluminum, or corrosion resistant thermoplastic, with a base width of 4 inches (min.) and a 3-1/4-inch diameter tablet or cap made of aluminum or brass. Regions may develop standards to provide for drilled or driven monuments with 3-1/4-inch caps. See EM 7150-3, Land Surveying Guide for appropriate tablet markings, additional details on setting monuments, and special case monumentation.

b. Monument accessories:

- (1) Bearing trees and/or reference objects. All corners must be referenced by a minimum of two accessories (EM 7150-3, Land Surveying Guide).
- (2) Guard Post and Sign. Every monument must have a guard post with appropriate sign or signs set near by (EM 7150-3, Land Surveying Guide).

3. Property Boundary Line Marking and Posting. The location of the corner point or monument at each end of a line defines location of the property line. The property line may be either a straight line or a curved line between the beginning point and the ending point, depending on the legal description of the property.

- a. Land corners must be monumented to standard before property lines are marked and posted.
- b. Line Trees. Line trees are trees identified as being on the property line. See EM 7150-3, Land Surveying Guide for marking details and procedures to use line trees to reestablish a lost corner position.

**FSM 7100 - ENGINEERING MANAGEMENT
CHAPTER 7150 - SURVEYING**

c. On-Line Monuments. A line monument must be set on the property line. Documentation of the monument location is required. See EM 7150-3, Land Surveying Guide for details on establishing and using a point-on-line monument to reestablish a lost corner position.

d. State and Federal statutory standards, which are more rigid, must be used as appropriate.

e. Property Line Visibility. Each Region shall establish visibility standards for line marking (blazes, hacks, and painting) and posting (placing of property boundary signs) based on the visibility guidelines found in EM 7150-3, Land Surveying Guide and commensurate with topography, vegetative cover, management concerns, land uses and values, and the risk of encroachment, within the following minimum standards:

(1) Boundary line signs must be placed on posts or trees within a 4-foot wide posting corridor which is defined as being 2 feet on each side of the exact location of the property line. See EM 7150-3, Land Surveying Guide for post and signing details.

(2) Trees blazed, hacked, and painted must be located within a 6-foot wide blazing corridor being defined as 3-feet wide on each side of the exact location of the property line. In sparse timber areas, increase the intensity of posting rather than expanding the width of the blazing corridor. See EM 7150-3, Land Surveying Guide for blazing, hacking, and painting details.

(3) Red enamel (GSA #11105) shall be the color used to identify National Forest System land corners and property lines.

4. Boundary Maintenance. Each Region shall establish a maintenance cycle commensurate with resource needs and field conditions.

Corners and lines not located and established by an acceptable official survey of record shall not be maintained.

See EM 7150-3, Land Surveying Guide for details on maintenance activities and how to handle property lines that were surveyed and marked to standards that are different from current standards.

7153 - RIGHTS-OF-WAY SURVEYS

A right-of-way may be created by easement deed, permit, license, deed reservation, or exception in a deed. They may be obtained for a definite time period or in perpetuity.

DANIELS SURVEY, P.C.

Debra Daniels Mithoefer, P.L.S.

Telephone: 802-362-5032

E-Mail: danielssurvey@usa.net

**TOWN OF DORSET, VERMONT
&
TOWN OF MANCHESTER, VERMONT
Town Line Boundary Survey**

PROJECT OUTLINE PREPARED ON September 19, 2019

BY DANIELS SURVEY, P.C. AT THE REQUEST OF THE TOWN OF DORSET & THE TOWN OF MANCHESTER

PROJECT UNDERSTANDING: Neither the Town of Dorset nor the Town of Manchester have direct knowledge of the location and status of their mutual town line boundary. Boundary surveys by others have depicted the approximate town line boundary location in different locations based on best available information at the time of their surveys. Tax map compilers have also indicated approximate town line boundary locations based on information provided to them by local authorities. Other authorities have added their two cents as well. These approximations of the town line boundary have been sufficient for past purposes. There now exists a need to be able to say with certainty just where the town line boundary exists on the ground and there is a need to appropriately perpetuate the town line boundary. The mutual town line boundary runs east to west and is approximately 6 miles in length.

PROJECT GOAL: The desired result of this project is to form a professional opinion about the location and status of the Dorset/Manchester town line boundary. Secondary to this goal will be the act of perpetuating said line on the ground and in the land records.

PROJECT DESCRIPTION: Preliminary search for and review of documents and physical evidence relevant to the present day location and status of the Dorset/Manchester town line. Thereafter, conduct additional research, search for and inspect physical evidence, gather evidence (field survey), compile information, reconcile written and physical evidence about the location and status of "the town line boundary", monument and map the town line as appropriate, prepare surveyors report detailing the project and assist as needed in providing survey support for any needed legal matters. Title 24: Municipal and County Government Chapter 47: Municipal Line (24 V.S.A. Section 1461), Title 26: Professions and Occupations Chapter 45 and the Administrative Rules of the Board of Land Surveyors, Part 5 and US Forest Service Land Line survey guidelines will serve as guiding documents.

OF NOTE: I have had recent discussions relative to the concept of a town line boundary survey with several surveyors and the Vermont Secretary of State Office. I have reviewed some case law relative to town lines. My initial approach to this project was to treat it like any other boundary survey I undertake. That approach is reflected in my proposal to all of you. There was nothing in my conversations with others that suggested I should take a different path. The consensus was as long as there is no dispute between the towns as to status and location of the town line boundary, then there is no reason to do anything but partner up and conduct a thorough and enduring job.

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MANCHESTER CENTER, VERMONT 05255**

This project should be performed in a manner that will enable both towns the ability to identify the location of the town line boundary on the ground and on a map with certainty for many generations to come. It is my belief that there is simple confusion as to location and status of this town line. From my position, that is very different from not being able to agree to the location. We just have to rediscover the historical evidence of the town line boundary and follow where it leads us. I have been quite amazed over the years at how much written and physical evidence our predecessors have left behind for us to rediscover so we can follow their footsteps!

PHASE 1: PROJECT PLANNING
Preliminary Information Gathering and Define Project Scope
Cost Estimate: \$2500

- Initial meeting with representatives of each town to discuss their views relative to the need and scope of a town line survey. Said meeting will also serve as an opportunity for Daniels Survey, P.C. to explain the various approaches to such a survey. This meeting may be a joint meeting if desired by both towns.
- Review relevant documents as they pertain to this project. Daniels Survey, P.C. respectfully requests each town provide Debra Daniels Mithoefer, PLS with copies of documents they believe to be pertinent to establishing the present day status and location of their mutual town line boundary.
- Serve notice of the survey to adjoining in both towns via letter. Ask for permission to access their land, invite input and explain the process.
- Preliminary search for written and physical evidence supporting the status and location of the town line. This will include preliminary work in local land records, state records and a preliminary search for physical evidence.
- Review of, analysis and compilation of the information gathered during the Phase 1.
- Formulate a preliminary professional opinion about the location and status of the town line.
- Prepare an action plan detailing a summary of additional research needed to support the field survey and written surveyors report.
- Prepare an action plan detailing the field survey.
- Prepare an action plan detailing the process of finalizing the project and providing the deliverables listed below.
- Review of the action plans with the Town of Dorset and the Town of Manchester.
 - Seek mutual agreement from all parties to implement PHASE 2: Research and Field Survey action plan.

PHASE 2: RESEARCH & FIELD SURVEY
Cost Estimate: \$15,000

- Continue records research as needed to establish a complete history of town line boundary status and location
- Continue search for physical evidence of the town line boundary location. This will include the search for original boundary markers as well as evidence along said boundary line that has served as witness to the town line. Attention will be given to areas of interest as identified by either Town.

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- Establish ground control as needed to facilitate location of physical evidence. This ground control shall reference Vermont State Plane Coordinate System.
- Field survey of physical evidence recovered on the ground.
- Review the work product with the Town of Dorset and the Town of Manchester.

FINALIZE PROJECT
Cost Estimate: \$5,000 - \$7000

- Compile and map field survey.
- Reconcile written and physical evidence.
- Finalize professional opinion and prepare surveyor's report.
- Prepare final survey plat
- Review the work product with the Town of Dorset and the Town of Manchester.
- **Submit the final survey plat to each town to allow for compliance with 24 VSA sec1461.**
 Upon ratification of the town line boundary by both municipalities, the town line boundary shall be monumented and witnessed according to the action plan agreed to in Phase1.

PERPETUATE PROJECT
Cost Estimate: \$5,000 plus costs

I recommend the line is witnessed on the ground as follows:

At the end points of the town line and every one mile segment, set very durable monument (see included example of marker). Each of these monuments should be referenced to nearby accessory corner monuments set such that they can be used to reestablish the location of the corner in the event the corner monument is lost or disturbed. Each of these monuments should be witnessed with an orange witness posts (see example).

At all road crossings a durable monument should be set along the town line on the east or west highway line. These monuments should also be witnessed with orange witness posts.

Along the town line, where practical, trees should be blazed and painted red with a good forestry paint according to the USFS standards. Additional witness posts should be set out intervisible or along the line at an agreed upon interval.

Recommended Deliverables

To each town for perpetuation purposes - electronic (.pdf) and hard copy of written documents to include research notes, field journals and survey field book, survey computations, meeting minutes, survey plat (.pdf) and surveyor's report.

At the completion of this project, I recommend the towns agree to a town line maintenance

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program. The details of such a program should be commensurate with local resources and field conditions.

This outline is a guideline and shall be revised as the project unfolds.

Actual costs shall be billed on an hourly rate according to the include rate sheet.

This cost estimate excludes costs associated with the purchase of durable boundary monuments, witness posts, marking paint, etc.

Daniels Survey, P.C. takes pride in working closely with clients to deliver an on time and on budget project.

DANIELS SURVEY, P.C., 227 SUGAR HOUSE LANE
MANCHESTER CENTER, VERMONT 05255

DANIELS SURVEY, P.C.

Debra Daniels Mithoefer, P.L.S.

Telephone/Fax: 802-362-5032

E-Mail: danielssurvey@usa.net

RATE SCHEDULE JANUARY 2019 – DECEMBER 2019

PROFESSIONAL LAND SURVEYOR \$105.00/HOUR

SURVEY TECH \$60.00/HOUR

CAD TECH \$75.00/HOUR

2 PERSON SURVEY PARTY \$130.00/HOUR

3 PERSON SURVEY PARTY \$160.00/HOUR

GPS STATIC SURVEY: SURVEY PARTY HOURLY RATE PLUS \$350.00 PER CONTROL POINT ESTABLISHED

DIRECT EXPENSES AT COST PLUS 5%

INVOICES ARE DUE ON RECEIPT

DANIELS SURVEY, P.C.

Debra Daniels Mithoefer, P.L.S.

Telephone: 802-362-5032

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TOWNS OF DORSET & MANCHESTER, VERMONT

Town Line Survey Assistance Agreement

Submitted to the Town of Dorset

&

The Town of Manchester

September 19, 2019

This agreement is made between Daniels Survey, P.C. and the Towns of Dorset & Manchester, VT

By signing below, Debra D. Mithoefer, P.L.S., acting for Daniels Survey, P.C. and the Towns of Dorset and Manchester, agree to work together to resolve discrepancies concerning the location of the town line dividing lands situated in the Town of Dorset land from lands situated in the Town of Manchester. The extent of work to be performed under this agreement shall be limited to what is described as Phase 1 in the Town Line Project Scope Proposal dated September 19, 2019. Said proposal is attached hereto and is part of this agreement.

The fixed fee cost for Phase 1 is reasonably determined and shall be billed bi-monthly in two invoices. One invoice for ½ the amount shall be delivered to the Town of Dorset and one invoice for ½ the amount shall be delivered to the Town of Manchester. Each invoice is payable in full upon receipt. We will strive to complete your project as efficiently and economically as is practically and prudently possible. Should unforeseen circumstances cause a change to this agreement, Daniels Survey, P.C. shall contact both towns to review the situation prior to proceeding with additional work which may not be included within the scope of this agreement.

Please contact me with any questions you might have. If you accept this proposal, please sign a copy of this proposal, keep a copy for yourself and return a copy to me.

Thank you for the opportunity to work with you on this project.

Sincerely,

Debra Daniels Mithoefer P.L.S.

Signed:

Debra Daniels Mithoefer _____

Date: _____

Town of Dorset _____

Date: _____

Town of Manchester _____

Date: _____

DANIELS SURVEY, P.C., 227 SUGAR HOUSE LANE
MANCHESTER CENTER, VERMONT 05255

Resume

Debra Daniels Mithoefer, L.L.S.
Daniels Survey, P.C.
227 Sugar House Lane
Manchester Center, Vermont 05255
(802) 362-5032 danielssurvey@usa.net

Education:	Middlebury College Middlebury, Vermont B.A., 1978, Environmental Studies and Geography
Experience:	President, Daniels Survey, P.C. (1989 to present) Associate, William F. Kent, Land Surveyor (1986 to 1989) Chief of Surveys, Town of Waterford, Ct. (1983 to 1986) Surveyor in Training, Town of Waterford, Ct. (1979 to 1983)
Professional Licenses	Vermont #615 (1989) New Hampshire #811 (1991) Massachusetts #36121 (1991)
Associations	Vermont Society of Land Surveyors (1989 to present) National Ski Patrol (1979 to present)
Related Professional Activities	Vermont Law School, Guest Lecturer, Land Surveying Town of Ludlow Planning Commission Member - Past Town of Ludlow Ancient Roads Committee Member - Past Vermont Board of Land Surveyors Member - Past

Debra Daniels Mithoefer is the principal of Daniels Survey, P.C., a past VTRANS WBE certified small business. After graduating from Middlebury College in 1978 with a B.A. in Environmental Studies and Geography, she began her career as a surveyor in 1979, establishing Daniels Survey in 1989. Ms. Mithoefer brings nearly 30 years of expertise as a professional land surveyor dealing with land boundary projects for individuals and several Vermont municipalities as well as serving as an expert witness for several land boundary disputes and ancient road cases. She also has many years of experience as a professional survey services sub-consultant teaming with many prime consulting firms. Ms. Mithoefer has been responsible for providing the survey services for several federal, state, municipal and privately funded boundary survey, civil, recreation, transportation and facilities projects. Deb has coordinated and provided survey services for prime consultants on projects to include a state highway corridor improvement project, a municipal visitors' center and recreation trail project, municipal multi use recreation paths, bridge reconstruction projects, waterfront revitalization projects, USDA NRCS property acquisition projects, a downtown redevelopment project and more recently several cemetery expansion projects.

Debra Daniels Mithoefer, Land Surveyor Biography

Debra Daniels Mithoefer, Land Surveyor. Debra Daniels Mithoefer is the principal of Daniels Survey, P.C. After graduating from Middlebury College in 1978 with a degree in Environmental Studies and Geography, she began her career as a surveyor in 1979 and established Daniels Survey in 1989. Ms. Mithoefer brings many years of experience as a professional survey services sub-consultant teaming with several prime consulting firms. Ms. Mithoefer has been responsible for providing the survey services for several state, municipal and privately funded land boundary, civil, recreational, transportation and facilities projects. Recently, she has coordinated and provided survey services for prime consultants on projects to include a state highway corridor improvement project, a municipal visitors' center project, municipal multi use recreation paths, bridge reconstruction projects, a waterfront revitalization project and several cemetery projects. She also brings nearly 30 years of expertise as a professional land surveyor dealing with land boundary and ancient road issues. She holds professional land surveyor licenses in Vermont, New Hampshire and Massachusetts.

When Deb is not busy serving her survey clients, she can be found at Bromley Mountain during the winter months skiing and acting as a weekend ski patrol supervisor. If she is not skiing for Bromley, Deb can be found traveling around the East teaching ski and toboggan clinics for the Eastern Division and the Certified Patroller programs.

Throughout the year, if Deb is not surveying or skiing, you will find her home on her farm that she shares with her husband, dogs, horses, sheep and most recently goats!! The farm is enrolled in the current use program and is actively managed for agriculture as well as forest products.

In order to keep up with all these activities, Deb continues to fit an exercise program into her daily routine. Trail running and road biking are the backbone of her exercise program. Having been a competitive athlete in high school and college, Deb finds the routine of regular exercise fun and rewarding.

Title 24 : Municipal And County Government

Chapter 047 : Municipal Lines

(Cite as: 24 V.S.A. § 1461)

• § 1461. Location or alteration of municipal lines; monuments

(a) When the legislative bodies of adjoining municipalities are able to agree as to the location of a municipal line, each legislative body shall vote in meetings duly warned for the purpose to adopt the location. Prior to the vote, each legislative body shall hold at least one public hearing duly warned for the purpose of informing the public of, and allowing public comment on, the location of the line. Following the meetings, the legislative bodies shall conduct a, or ratify an existing, survey of the municipal line and file certified copies of the minutes of the meetings, and the survey, and a list of property owners, the legal location of whose property is changed by the agreement, with the Secretary of State, the clerk of each of the municipalities, and the Vermont Enhanced 911 Board.

(b) When the legislative bodies of adjoining municipalities are unable to agree as to the location of a municipal line, or in the absence of a clearly definable charter line, the legislative bodies shall sign a written agreement to submit to arbitration pursuant to 12 V.S.A. chapter 192.

(1) If an award of arbitration does not alter a municipal line, the award shall be filed with the Secretary of State and the clerk of each of the municipalities.

(2) If an award of arbitration would result in an alteration of a municipal line, the award shall require that a survey be conducted of the municipal line and apportion the cost of the survey between or among the respective municipalities as deemed appropriate. Following the survey, one or more of the legislative bodies shall petition the General Assembly to adopt the alteration of the municipal line pursuant to the survey. Following enactment of legislation which alters a municipal line, the legislative bodies shall file the survey and a list of property owners, the legal location of whose property is changed by the award, with the Secretary of State, the clerk of each of the municipalities, and the Vermont Enhanced 911 Board. Each legislative body of the adjoining municipalities shall post a notice of the petition to the General Assembly that specifies the nature and extent of the proposed legislation in at least two public places and in the town clerk's office at least three weeks prior to filing the petition.

(c) When the legislative bodies of adjoining municipalities are able to agree as to the location of a municipal line and one or more of the legislative bodies believes that alteration of the existing line or the establishment of a new line is necessary, the

legislative bodies shall conduct a survey of the new municipal line. Following the completion of the survey, one or more of these legislative bodies shall petition the General Assembly to establish the location of the municipal line. Following the enactment of legislation which ratifies the alteration of the municipal line, the legislative bodies shall file the survey and a list of property owners, the legal location of whose property is changed by the legislation, with the Secretary of State, the clerk of each of the municipalities, and the Vermont Enhanced 911 Board. Each legislative body of the adjoining municipalities shall post a notice of the petition to the General Assembly that specifies the nature and extent of the proposed legislation in at least two public places and in the town clerk's office at least three weeks prior to filing the petition.

(d) When the General Assembly enacts legislation which ratifies a survey of a municipal line, it may appropriate funds sufficient to monument those municipal lines at the points on the municipal lines where the lines change direction. If the legislative body of a municipality desires additional monuments, it shall provide funds for those monuments at the expense of the municipality.

(e) A survey required by this section shall be conducted by a land surveyor licensed in this State.

→ (f) The Secretary of State, in consultation with the Agency of Transportation, shall develop a process for requesting proposals for surveying for use by municipalities.

(g) Upon receipt of a list of property owners filed pursuant to subsection (a), (b), or (c) of this section, a municipal clerk shall file the list in the land records of the municipality and shall place in the grantee index of those records the names of property owners whose land or portion thereof has been added to the municipality and in the grantor index of those records the names of property owners whose land or portion thereof has been subtracted from the municipality. (Amended 1967, No. 241 (Adj. Sess.), § 2, eff. Feb. 13, 1968; 1973, No. 193 (Adj. Sess.), § 3, eff. April 9, 1974; 2005, No. 102 (Adj. Sess.), § 1.)

The Vermont Statutes Online

Title 12: Court Procedure

Chapter 192: Arbitration Act

- *Subchapter 1: General Provisions*
- § 5651. Short title

Part 5. Standards for the Practice of Land Surveying

5.1 Authority The Vermont Board of Land Surveyors is authorized by the legislature to adopt rules establishing minimum standards of practice. 26 VSA § 2544(9).

5.2 Purpose and Intent

(a) The purpose of these standards is to establish minimum procedural and technical criteria to govern the performance of land surveyors when more stringent standards are not required. Further, the purpose is to protect the inhabitants and property owners in this state from substandard or incompetent surveying, and generally to safeguard property and the public welfare.

(b) These standards are also a guide for land surveyors in their daily practice and for intern surveyors working to enter the profession.

(c) These standards are intended to allow land surveyors flexibility in their surveying methods and the collection and interpretation of evidence necessary for boundary determination.

(d) If possible, the land surveyor shall locate the corners and boundaries of the property under survey. These standards are developed to satisfy that minimum result.

5.3 Definitions For the purpose of this part:

(a) “Boundary” means: A line of demarcation between adjoining properties and indicating the furthest extent of property.

(b) “Corner” means: A point on a boundary, at which two or more boundaries intersect.

(c) “Document” means: Any instrument which may be used as evidence. A document makes record of letters, figures, marks, or any combination thereof. The term “document” shall be applied broadly to include writings and printed works, maps and plans, photographs and pictures, seals and plates. Documents include record evidence and may be found in a number of locations in addition to the municipal clerks’ offices.

(d) “Evidence” means: Information, observations, or objects that may aid the surveyor in locating the position of a boundary.

(e) “Inconsistency” means: An uncertainty; doubtfulness or a want of clearness and definiteness. Inconsistency means also an ambiguity or that which is difficult to comprehend or distinguish. An inconsistency occurs when title to the same property is expressly conveyed to different parties, where a gap exists between descriptions, or when one party has title and another party has possession, or the documents and record evidence contain ambiguities or conflicting terms.

(f) “Key deed” means the deed which originally created the boundary.

(g) “Land Surveying” means: The definition provided by 26 V.S.A. § 2502.

(h) "Land Surveyor" means a person with a legal right to be in responsible charge of a property survey in this State.

(i) "Monument" means: A physical structure, mark or object that serves to perpetuate the location a corner or point on a boundary. Permanence, durability and stability are implied.

(j) "Positional Tolerance" means: The maximum theoretical uncertainty (at the 95% confidence level) of a measurement between any two corners under survey. The positional tolerance allowed is expressed as a constant (base error) plus the indicated ratio (dependent error) applied to said corners.

(k) "Property:" Property includes land, water, land under water, space, improvements and rights, and easements and servitudes attached thereto.

(l) "Survey Abstract" means: A chronological, condensed history of the record documents pertaining to property boundaries including, but not limited to, conveyances and deeds which may control the location of corners and boundaries of the land under survey.

(1) A survey abstract includes legal descriptions that originally created the subject and abutting parcel(s) which control the location of the corners and boundaries of the property under survey and the abutting properties.

(2) A survey abstract includes pertinent documents related to easements or servitudes that may encumber or benefit the property under survey.

(3) A survey abstract shall be sufficient, if possible, to enable the land surveyor to locate the corners and boundaries of the property under survey and to meet the requirements of these standards.

5.4 Procedural Standards Whenever a land surveyor conducts a survey of property, the surveyor shall, at a minimum, perform the following:

(a) Research and Field Investigation:

(1) Prepare a survey abstract.

(2) Examine, analyze and test consistency of the record evidence. Investigate and document inconsistencies and form preliminary conclusions as to the completeness of the record evidence.

(3) If necessary, obtain and document from knowledgeable and credible persons parol evidence which may control the location of the corners and the boundaries of the property under survey.

(4) Search for physical evidence which may control the location of the corners and the boundaries of the property under survey. Existing monumentation and physical evidence should not be removed or disturbed.

(5) Record and document in detail all physical evidence found or physical evidence of record not found. Descriptions shall include materials, size and shape, identifying marks or numbers, position and stability; cylindrical sizes shall be reported as inside or outside diameter. Position reported shall include the distance above or below ground.

(6) Make, record, and document measurements to ensure the location and perpetuation of pertinent physical evidence.

(b) Computations, Conclusions, and Perpetuation:

- (1) Compute, check, and compare field measurements and pertinent information with record evidence.
- (2) Investigate, document and, if possible, reconcile inconsistencies.
- (3) When necessary, make additional computations and analyses to develop and formalize opinions on the location of the corners and boundaries of the property under survey. Professional opinions shall be based on the best available evidence and in accordance with applicable Vermont boundary law and the established hierarchy of evidence.
- (4) A land surveyor who conducts a survey of property shall set monuments and marks to adequately perpetuate the location of unmarked corners and boundaries of the property under survey.

(c) Results: When the land surveyor cannot prepare a professional opinion on the location of a corner or boundary, the surveyor shall:

- (1) Search for and recover additional or missing evidence that will enable the surveyor to form a professional opinion on the boundaries; or
- (2) Issue a report describing, at a minimum, controlling evidence and conclusions and any inconsistencies, conflicts, or unusual circumstances.

5.5 Technical Standards Only two measurement standards are acceptable. Either the accuracy standard or precision standard may be used. The surveyor shall determine which standard should be used based on the current and future needs of the project. The surveyor shall select and employ proper field procedures, instrumentation, and personnel to achieve the applicable measurement standard.

(a) **Survey Classes** Guidelines for selection of survey classes by land use.

- (1) Urban - Surveys of more densely settled or developed land lying within or adjoining a city, village or town center. This includes the surveys of commercial and industrial properties, condominiums, town houses, apartments, and other multi-unit developments, regardless of geographic location.
- (2) Suburban - Surveys of land lying outside urban areas and used almost exclusively for single family residences or residential subdivisions.
- (3) Rural - Surveys of lands such as farms and other undeveloped land outside of suburban areas.

(b) **Measurement Standards**

(1) Accuracy Standard: The maximum positional tolerance of any point on the subject boundary is;

- (A) Urban 0.05 feet plus 1:10,000
- (B) Suburban 0.10 feet plus 1:5,000
- (C) Rural 0.25 feet plus 1:5,000

(2) Precision Standards: Minimum traverse precision ratio after angles are balanced and closure is calculated;

- (A) Urban 1:10,000
- (B) Suburban 1:10,000

(c) Survey Plats A land surveyor who conducts a survey shall, when contracted for by the client, prepare a plat showing the results of the survey and shall furnish a copy to the client. The plat shall be prepared in accordance with the latest adopted version of 27 V.S.A. §1403, Filing of Survey Plats, and 26 V.S.A. § 2596(a), Use of Seal, Certification, and shall also include the following information:

- (1) A detailed description of natural and artificial monuments, noted as found or set. Descriptions shall include materials, size and shape, identifying marks or numbers, position and stability. Cylindrical sizes shall be reported as inside or outside diameter. Position reported shall include the distance above or below ground.
- (2) A delineation of inconsistencies between the survey and the record description and the source of information used as the basis of the survey.
- (3) The name and deed references of the title holder and the adjoiners at the time of survey.
- (4) Visible encroachments onto or from adjoining property or streets and the extent of such encroachments.
- (5) Public and private rights-of-way, easements and rights which are reasonably known or observed that encumber or benefit the land surveyed.
- (6) Sufficient boundary survey data to provide a closed geometric figure of a perimeter survey. A survey of a boundary line adjustment shall have sufficient information to tie into the client's adjoining boundary lines.
- (7) Inscriptions noting the specific evidence used to locate the corners and land boundaries. List sources of information used as the basis for boundary location. Include key deed references.
- (8) The certification statement shall clearly set forth what information was used as the basis of the survey and shall specifically indicate that the survey work identified thereon is consistent with this information. 26 V.S.A. § 2596.
- (9) All lettering and data must be clearly legible.

(d) Monuments

- (1) Monuments shall be durable and stable.
- (2) Monumentation set shall be identified with the license number of the surveyor in responsible charge.
- (3) Monuments set replacing inadequate monuments or missing monuments shall conform to this standard, be documented, and the document be recorded in the public land records.

**FSM 7100 - ENGINEERING MANAGEMENT
CHAPTER 7150 - SURVEYING**

Land surveying activities require access and entry on private land. Most State laws provide the surveyor access to land monuments for the purposes of survey. Line clearing and other surveying activities on private land shall be minimal to prevent adverse relations with the landowner and the potential for a damage or liability claim against the surveyor.

State laws dictate survey standards and document recordation format and procedures. Forest Service surveys shall comply with State survey standards unless our minimum standards are greater than required by the State (FSM 7152.6). The Forest Service shall comply with the State procedures and format for recording documents in the public record.

3. Local Laws and Customs. Line and Staff Officers shall be knowledgeable of local laws and customs affecting land surveys. Any conflicts between Federal, State, and local laws shall be resolved in consultation with the Office of the General Counsel.

7152.5 - Interagency Cooperation

The BLM and Forest Service cooperative survey program includes the following (FSM 1531.1):

1. The Interagency Memorandum of Agreement dated March 19, 1980, provides for Federal survey authority for selected Forest Service employees to accomplish specific land surveying projects under special instructions issued by the BLM.
2. A reimbursable survey or fund transfer program for long-term, project type work that will be financed by the Forest Service and surveyed or accomplished by the BLM. The work may be done entirely by the BLM, or a BLM supervisory surveyor may be assigned to a Forest Service unit to accomplish land surveys using Forest Service field crews and/or contracting procedures.
3. A cooperative training program to develop and accomplish interagency training courses, slide/tape training courses, and some college level training courses in selected surveying subjects.
4. Unusual surveying equipment is available for Forest Service use from the BLM equipment cache.

7152.6 - Standards

1. Survey standards for the establishment of property corners and/or reestablishment of lost corner positions are usually specified by either Federal regulations or State statutes. Minimum Forest Service survey accuracy standards are:

- a. Survey techniques shall ensure a survey error of closure of not less than 1/5000 (1 unit of error in 5000 units).

**FSM 7100 - ENGINEERING MANAGEMENT
CHAPTER 7150 - SURVEYING**

b. Corner positional accuracy standards are specified in EM 7150-3, Land Surveying Guide.

c. State and Federal statutory standards, which are more rigid, shall be used as appropriate.

2. Monumentation Standards. Monumentation of property and property controlling corners is a function reserved by Federal and State law to properly authorized surveyors.

a. Corner monuments:

(1) Surveys performed under Federal survey authority must use monuments and procedures as specified by the BLM.

(2) Minimum Forest Service standards for monuments set under State survey authority shall be 2-1/2 inches outside diameter pipe, made of iron, aluminum, or corrosion resistant thermoplastic, with a base width of 4 inches (min.) and a 3-1/4-inch diameter tablet or cap made of aluminum or brass. Regions may develop standards to provide for drilled or driven monuments with 3-1/4-inch caps. See EM 7150-3, Land Surveying Guide for appropriate tablet markings, additional details on setting monuments, and special case monumentation.

b. Monument accessories:

(1) Bearing trees and/or reference objects. All corners must be referenced by a minimum of two accessories (EM 7150-3, Land Surveying Guide).

(2) Guard Post and Sign. Every monument must have a guard post with appropriate sign or signs set near by (EM 7150-3, Land Surveying Guide).

3. Property Boundary Line Marking and Posting. The location of the corner point or monument at each end of a line defines location of the property line. The property line may be either a straight line or a curved line between the beginning point and the ending point, depending on the legal description of the property.

a. Land corners must be monumented to standard before property lines are marked and posted.

b. Line Trees. Line trees are trees identified as being on the property line. See EM 7150-3, Land Surveying Guide for marking details and procedures to use line trees to reestablish a lost corner position.

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c. On-Line Monuments. A line monument must be set on the property line. Documentation of the monument location is required. See EM 7150-3, Land Surveying Guide for details on establishing and using a point-on-line monument to reestablish a lost corner position.

d. State and Federal statutory standards, which are more rigid, must be used as appropriate.

e. Property Line Visibility. Each Region shall establish visibility standards for line marking (blazes, hacks, and painting) and posting (placing of property boundary signs) based on the visibility guidelines found in EM 7150-3, Land Surveying Guide and commensurate with topography, vegetative cover, management concerns, land uses and values, and the risk of encroachment, within the following minimum standards:

(1) Boundary line signs must be placed on posts or trees within a 4-foot wide posting corridor which is defined as being 2 feet on each side of the exact location of the property line. See EM 7150-3, Land Surveying Guide for post and signing details.

(2) Trees blazed, hacked, and painted must be located within a 6-foot wide blazing corridor being defined as 3-feet wide on each side of the exact location of the property line. In sparse timber areas, increase the intensity of posting rather than expanding the width of the blazing corridor. See EM 7150-3, Land Surveying Guide for blazing, hacking, and painting details.

(3) Red enamel (GSA #11105) shall be the color used to identify National Forest System land corners and property lines.

4. Boundary Maintenance. Each Region shall establish a maintenance cycle commensurate with resource needs and field conditions.

Corners and lines not located and established by an acceptable official survey of record shall not be maintained.

See EM 7150-3, Land Surveying Guide for details on maintenance activities and how to handle property lines that were surveyed and marked to standards that are different from current standards.

7153 - RIGHTS-OF-WAY SURVEYS

A right-of-way may be created by easement deed, permit, license, deed reservation, or exception in a deed. They may be obtained for a definite time period or in perpetuity.

